

5. Hybrid Beams Consisting of H-Shaped Steel and Reinforced Concrete Ends - Part 2 : Improved toughness performance and damage suppression -

Satoshi Yamagami, Takeshi Kishimoto, Yoshiki Koyama, Yasuhiro Oka,
Atsushi Sorimachi, Masashi Funatsu, Ryo Ueta

Compared to simple steel beams, hybrid structural beams in which a steel beam is embedded in reinforced concrete beams at both ends can increase the rigidity of the member and reduce deformation. A previous report presented a study of structural tests of a hybrid beam for foundation beams in which the length of embedment in the RC beam was twice of the steel beam depth; the purpose of that study was to confirm the deformation performance and method for evaluating ultimate strength.

Based on the goal of expanding the scope of application to the beams of upper structures, this study undertook structural testing to clarify structural performance. To achieve building functionality and acceptable floor height, the depth of beams on the aboveground floors must be smaller than that of foundation beams. This requirement poses difficulties in assuring deformation performance. Structural experiments with several specifications of RC beam confirmed that it is possible to achieve sufficient deformation performance by setting the effective shear reinforcement ratio to 0.007 or more and the shear stress level to 0.12 or less.

This approach allows use of hybrid beams in aboveground floors.

Key words: hybrid beam, damage control, effective shear reinforcement ratio, shear stress level